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ment by Canada to Great Britain dates from 1898, and not 1897, as stated by the author (p. 269).

There is no adequate ground for accepting Lord Ripon's despatch to the governors of the British self-governing colonies in 1895, in which are defined the principles which the colonies must follow in their tariff negotiations with foreign countries, as a binding definition of the scope of British colonial autonomy in tariff matters. Mr. Gregory is wrong when he gives the impression that it is, or ever was, accepted by the colonies as the last word on the subject (pp. 269, 270). As a matter of fact, Ripon's chief dictum, "Her Majesty's Government regard it as essential that any tariff concessions proper to be conceded by a Colony to a Foreign Power should be extended to this country and to the rest of Her Majesty's Dominions," was not enforced either against the reciprocal arrangement between Cape Colony and the Orange Free State which was in effect when Ripon's despatch was sent, or against the similar arrangement still in effect between the Transvaal and Mozambique.

The exemption from a fraction of the export duty on tin ore in the Federated Malay States which was granted in 1903 if the ore was exported to be smelted in the Straits Settlements, and extended in 1904 to ore exported to the United Kingdom (p. 288), was further extended in 1916 to ore exported for smelting to Australia. The origin of this differential treatment of a raw material is somewhat obscure. When first enacted it was an exception to the general rule, rigidly enforced by the British Imperial authorities, that the commercial policies of the dependent parts of the Empire should be managed in strict accord with the principle of the open door. In the post-war period this differential export duty has been cited as a precedent for a more extensive program of treatment along the same lines of the raw materials of the British crown colonies.

Finally, the prohibition of export duties was not incorporated in the American Constitution because "a certain prejudice attaches to export and transit duties which one does not find in the case of import duties" (p. 483). It was, of course, due rather to the fear of the Southern states that if export duties were levied they would be imposed chiefly on southern products, and especially on cotton and tobacco, and their refusal to concede to the federal government the authority to levy import duties—also likely to operate chiefly in the interests of the North Atlantic States—unless accompanied by a prohibition of export duties. It was a matter, therefore, not of prejudice, but of conflicting sectional interests adjusted by compromise. The individual Southern States had themselves made important use of export duties prior to 1789.

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*Essentials of Mental Measurement.* By William Brown and Godfrey H. Thomson. Cambridge Press, 1921. x, 216 pp.

This edition is so radical a revision of the first edition by Mr. Brown as in reality to constitute a new work. The best of the earlier work has been retained, and five entirely new chapters, the work of Mr. Thomson, have been added. These chapters are:

- II. The Elementary Theory of Probability
- IV. Skewness and Heterogeneity in Psychophysical Data
- VII. The Influence of Selection
- IX. The Theory of General Ability
- X. A Sampling Theory of Ability

Part I is entitled "Psychophysics," and Part II, "Correlation." However, the book could properly be divided into three parts—psychophysics, correlation, and a criticism of theories of ability. The chapters upon psychophysics aim to give the elementary statistics required in the handling of psychophysical data, and though the rules and explanations given are excellent and more rigorous than are usually found in elementary treatises, it can hardly be said that the ground is adequately covered for the needs of the experimental psychologist who is unfamiliar with the basic concepts of frequency distributions. The more special problems of psychophysics are fully dealt with. The chapter upon correlation parallels the work of the first edition, and an important chapter upon the influence of selection is added. Here again the treatment is too brief to meet the ordinary needs of the psychologist.

In the opinion of the reviewer the most interesting contribution of the book lies in the thoroughness with which the authors have demolished Hart and Spearman's criterion for the existence of a hierarchical order among coefficients of correlation.

The book shows careful thought and workmanship throughout, and the following criticisms are inconsequential as far as the general appraisement is concerned. On page 16 the value of the lower quartile is given as that of the  $N + \frac{1}{4}$  measure, whereas it should be that of the  $N + \frac{1}{2}$  measure. This leads to error in the lower and upper quartiles and in the interquartile range. The treatment (beginning with page 60) of the important though admittedly difficult point concerning the effect of different proportions of equal judgments when less than, equal, or greater than judgments are recorded is inadequate.

The only unmitigatedly bad advice in the book concerns the use of "catch tests" and the treatment of erratic answers [component a]. The reviewer objects to the following statement which is quoted from page 93: "Use of 'catch' tests in threshold determinations is to check component (a). The proper way to employ them is to cancel sittings at which numerous catch errors occur, the subject being then presumably in an abnormal state."

At a number of points throughout the book there is the implication that correlation and other statistical constants calculated from a population of thirty or less is of very slight significance because probable errors are unknown. This caution is in the right direction, but it is far from accurate to imply that populations of thirty or somewhat less cannot yield valuable information if treated statistically and interpreted in the light of known probable errors of small quantities. From the standpoint of practical psychology we particularly need to know if tendencies suggested by small populations are worth further investigation.

The authors admit, or possibly we would better say, claim, differences of opinion between themselves and Professor Spearman, and in their enthusiastic en-

deavor to show errors in Spearman's work do not clearly differentiate between inconsequential and material errors in his mathematical processes. Every statistician at times makes assumptions of normality, rectilinearity, independence between variables, etc., which are not strictly true. It is not sufficient that the critic establish the fact that the assumption is inaccurate; he must go further and show that it leads to material error. Several of the Brown and Thomson criticisms of Spearman fail to establish the material nature of the error in the Spearman assumptions, *e. g.*, the error involved in using  $r_{xy}$  in the formula for correction for attenuation in place of  $\sqrt[4]{r_{x_1y_1}r_{x_2y_2}r_{x_3y_3}r_{x_4y_4}}$ .

The "Sampling Theory of Ability" formulated by Thomson seems to the reviewer to be a concise statement of a point of view already held by many psychologists. It is a distinct addition, however, to have it so definitely stated as to suggest an experimental and mathematical testing and comparison with alternative theories.

On the whole, Brown and Thomson have made a contribution which is not only helpful in the detailed problems of psychological statistics but suggestive and forward-looking in the more subtle problems of mental acquisition. It will find a place in every psychological library and laboratory.

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*Report of the Federal Trade Commission on the Pacific Coast Petroleum Industry.*

*Part 1: Production, Ownership, and Profits.* Washington: Government Printing Office, April 7, 1921. 276 pp.

The investigation resulting in this report was authorized by a resolution of the Senate passed on July 31, 1919. The resolution was introduced by the Senator from Washington, and the occasion of the resolution was the "recent advance in the market price in the United States, especially on the Pacific coast, of fuel oil, kerosene, gasoline, and other petroleum products." The results of the investigation were transmitted to the Senate on April 7, 1921, and Part 1 of the report was made available to the public several months later,<sup>1</sup> fully two years after the inception of the investigation and at a time when the prices of petroleum products were slowing up from the most precipitous decline in the history of the industry.

The report is the result of a detailed study of the records of a large number of operating companies, supplemented by additional information gathered through questionnaires, and a thorough compilation of published statistics. The work of analysis is handled largely by means of accounting technique, with only incidental employment of supplementary methods of economic analysis. The data are studied mainly from the point of view of conditions within the petroleum industry; the bearing of fundamental economic factors such as the price

<sup>1</sup> A brief summary of the report was published more promptly under the title, *Summary of Report of the Federal Trade Commission on the Pacific Coast Petroleum Industry. Part 1: Production, Ownership, and Profits.* The second part of the report (yet to appear) "will discuss the prices of crude petroleum, of fuel oil, and refined petroleum products in the principal markets on the Pacific coast, the methods of distribution and of marketing such products, and the conditions of competition in the entire Pacific coast territory."